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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,310	09/22/2005	Hannu Makela	47121-5008	1918

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DRINKER BIDDLE & REATH (DC)
1500 K STREET, N.W.
SUITE 1100
WASHINGTON, DC 20005-1209

EXAMINER	
NGUYEN, CHUONG P	

ART UNIT	PAPER NUMBER
3663	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,310	MAKELA ET AL.	
	Examiner	Art Unit	
	Chuong Nguyen	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/19/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of invention II in the reply filed on 08/20/2007 is acknowledged. The traversal is on the ground(s) that the inventions are linked to form a single general inventive concept. This is found persuasive; therefore, the restriction/election requirement has been withdrawn.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 6, the limitation of a movable carrier is not positively claimed because the word "*may*" renders the claim indefinite.

Other claims are also rejected based on their dependency of the defected parent claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarangapani (IDS reference – 6,055,042) in view of Makela et al (WO 02/093282) and Ishida et al (IDS reference – 5,572,428).

Regarding claim 1, Sarangapani discloses a method of preventing a mine vehicle from colliding comprising: determining for the mine vehicle at least one safe area (i.e. zone of interest) provided within an area between minimum distances (i.e. near range) and maximum distances (i.e. far range) determined with respect to the vehicle (Fig 2 "204, 208"; Fig 3 "308"; Fig 4-5 "406, 408"; col 3, lines 6-60; col 4, line 35 – col 5, line 22); scanning the environment in front of the vehicle when driving the vehicle in one movement direction (Fig 3-7; Fig 8 "802"; col 3, lines 6-60; at least col 4, line 35); carrying out a first collision examination wherein the safe area in front of the vehicle is monitored (Fig 8 "804-812"). Sarangapani does not explicitly disclose the steps of determining also at least one sideward safe area for the vehicle, determining an obstacle-free route on the basis of scanning results, and determining points in a sideward

direction of the vehicle to restrict the route; forming memory points on the basis of coordinates of the points restricting the route, and storing the memory points in the control system; and carrying out a second collision examination wherein at least one sideward safe area of the vehicle is monitored and issuing collision warning messages if an obstacle is detected within the safe area and if even one of the memory points resides within the safe area being monitored. Makela et al teach in the same field of endeavor the steps of determining at least one sideward safe area for the vehicle (i.e. determining the wall surface profiles by measuring means), determining an obstacle-free route on the basis of scanning results (i.e. determine the corrective measures required), and determining points in a sideward direction of the vehicle to restrict the route (i.e. obtaining wall surface profiles) (Fig 1; [0001]-[0002]; [0004], lines 19-32; [0012]-[0014]); forming memory points on the basis of coordinates of the points restricting the route, and storing the memory points in the control system ([0001], lines 8-15); and carrying out a second collision examination wherein at least one sideward safe area of the vehicle is monitored (i.e. comparing the obtained wall surface profiles with wall profiles stored in the memory and correcting deviation if any) ([0001]-[0002]; [0004]; [0014]). Ishida et al teach in the same field of endeavor the step of issuing collision warning messages if an obstacle is detected within the safe area and if even one of the memory points resides within the safe area being monitored (Fig 1 "8"; Fig 5-10; col 5, lines 19-22; col 6, line 18 – col 8, line 18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Makela et al and Ishida et al in the method of Sarangapani for efficiently detecting the sideward safe area, properly correcting the deviation and providing the warning; thus protecting the vehicle from potential collision.

Regarding claim 2, Sarangapani does not explicitly disclose the steps of simulating in advance, on the basis of position and control data, the path of movement of at least one part of the vehicle in the control system; carrying out the second collision examination by taking into account the path of movement obtained by simulation; and adjusting, on the basis of the second collision examination, steering movements of the vehicle in order to avoid overstepping the sideward safe area. Ishida et al teach in the same field of endeavor the steps of simulating in advance, on the basis of position and control data, the path of movement of at least one part of the vehicle in the control system; carrying out the second collision examination by taking into account the path of movement obtained by simulation (Fig 2 "S3-S11; at least col 5, line 40). Makela et al teach in the same field of endeavor the step of adjusting, on the basis of the second collision examination, steering movements of the vehicle in order to avoid overstepping the sideward safe area ([0004]; [0014]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Makela et al and Ishida et al in the method of Sarangapani for efficiently determining the potential collision of the sideward area of the vehicle and properly correcting the vehicle movement to avoid the collision.

Regarding claim 3, Sarangapani does not explicitly disclose the step of storing substantially continuously the memory points in a ring buffer provided in the control system; and updating for the second collision examination the memory points in a ring memory with respect to the movement of the vehicle. Makela et al teach in the same field of endeavor the step of storing substantially continuously the memory points in a ring buffer provided in the control system; and updating for the second collision examination the memory points in a ring memory with respect to the movement of the vehicle ([0001]-[0002]; [0004]; [0014]). It would have been

obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Makela et al in the method of Sarangapani for better accuracy in determining the potential collision of the sideward area of the vehicle.

Regarding claim 6, Sarangapani discloses in Fig 1-7 a mine vehicle (i.e. mining truck) comprising at least: a movable carrier (i.e. mobile machine 102) that may be driven in a first movement direction and in a second movement direction, at least one scanner (i.e. near range obstacle sensor 204; far range obstacle sensor 208), and a control system (i.e. control system 212) including at least a first control unit arranged on the carrier (col 2, line 53 - col 3, line 13); and wherein at least one scanner is configured to scan the environment in front of the vehicle in order to detect obstacles (col 3, lines 6-60; at least col 4, line 35); at least one safe area (i.e. zone of interest 308, 406, 408) defined by minimum distances (i.e. near range) and maximum distances (i.e. far range) determined with respect to the vehicle is determined in the control system (col 4, line 48 - col 5, line 13); and which control system is configured to monitor scanning results (Fig 8 "804-812"). Sarangapani does not explicitly disclose at least one safe area in a sideward direction of the vehicle is further determined, the control system allows several memory points including their position information to be stored therein the memory points defining sideward points of the route and based on the scanning results, and the control system is configured to monitor at least one sideward safe area of the vehicle and to issue a collision warning message if an obstacle is detected within the safe area in front of the vehicle and if even one of the memory points resides within the safe area being monitored. Makela et al teach in the same field of endeavor at least one safe area in a sideward direction of the vehicle is further determined, the control system allows several memory points including their position

information to be stored therein the memory points defining sideward points of the route and based on the scanning results, and the control system is configured to monitor at least one sideward safe area of the vehicle (Fig 1; [0001]-[0002]; [0004]; [0012]-[0014]). Ishida et al teach in the same field of endeavor in Fig 1 a warning device 8 for issuing a collision warning message if an obstacle is detected within the safe area in front of the vehicle and if even one of the memory points resides within the safe area being monitored (Fig 5-10; col 5, lines 19-22; col 6, line 18 – col 8, line 18). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the system of Makela et al and Ishida et al in the system of Sarangapani for efficiently detecting the sideward safe area, properly correcting the deviation and providing the warning; thus protecting the vehicle from potential collision.

Regarding claim 7, Sarangapani discloses in Fig 3-5 the scanners (i.e. near and far range obstacle sensors) directed in a first movement direction and provided with a safe area of its own (col 5, line 35 – col 6, line 23). Sarangapani does not explicitly disclose the scanner directed in a second movement direction and provided with a safe area of its own. Makela et al teach in the same field of endeavor in Fig 1 the measuring means 3 located on the front frame and measuring means 4 located on the rear frame of the vehicle for scanning the surrounding environment and wherein each movement direction is provided with a safe area of its own ([0001]-[0002]; [0004]; [0014]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the scanning system of Makela et al in the system of Sarangapani for efficiently determining the safe area for the vehicle and protecting the vehicle from potential collision.

7. Claims 4-5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarangapani modified by Makela et al and Ishida et al as applied to claims 1 and 6 above, and further in view of Burns (IDS reference – 6,393,362).

Regarding claim 4, Sarangapani modified by Makela et al and Ishida et al disclose the step of controlling the vehicle unmannedly (**Sarangapani** – col 2, lines 58-61; col 4, line 55+; col 6, line 63+). Sarangapani modified by Makela et al and Ishida et al do not explicitly disclose the step of utilizing a data transmission connection provided between the first control unit residing on the carrier of the vehicle and a second, external control unit. Burns teaches in the same field of endeavor in Fig 10 the step of utilizing a data transmission connection provided between the first control unit (i.e. control modules 80) residing on the carrier of the vehicle and an external control unit (i.e. base station 76) (col 9, lines 1-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Burns in the method of Sarangapani modified by Makela et al and Ishida et al for efficiently providing instructions / guidance to the autonomous vehicles.

Regarding claim 5, Sarangapani modified by Makela et al and Ishida et al do not explicitly disclose the step of updating dimensions of at least one safe area on the basis of the location of the mine vehicle. Burns teach in the same field of endeavor the step of updating dimensions of at least one safe area (i.e. safety envelope) on the basis of the location of the mine vehicle (col 5, line 24 – col 6, line 67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Burns in the method of Sarangapani modified by Makela et al and Ishida et al for better accuracy in determining the safe area of the vehicle; thus, efficiently protecting the vehicle from potential collision.

Regarding claim 8, Sarangapani modified by Makela et al and Ishida et al do not explicitly disclose the minimum distances of the safe area are determined according to the external shape and structure of the mine vehicle. Burns teach in the same field of endeavor the minimum distances of the safe area (i.e. minimum physical operating space) are determined according to the external shape and structure of the mine vehicle (col 5, line 35 – col 6, line 67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the safe area determination as taught by Burns in the system of Sarangapani modified by Makela et al and Ishida et al for better accuracy in determining the safe area of the vehicle; thus, efficiently protecting the vehicle from potential collision.

Regarding claim 9, Sarangapani modified by Makela et al and Ishida et al disclose the mine vehicle is unmanned (**Sarangapani** – col 2, lines 58-61; col 4, line 55+; col 6, line 63+). Sarangapani modified by Makela et al and Ishida et al do not explicitly disclose the first control unit is through a data transmission connection connected to a second, external control unit in order to transfer control data between the control units. Burns teach in the same field of endeavor in Fig 10 the first control unit (i.e. control modules 80) is through a data transmission connection connected to a second, external control unit (i.e. base station 76) in order to transfer control data between the control units (col 9, lines 1-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such data transmission for the control units as taught by Burns in the system of Sarangapani modified by Makela et al and Ishida et al for efficiently providing instructions / guidance to the autonomous vehicles.

Regarding claim 10, Sarangapani modified by Makela et al and Ishida et al do not explicitly the control system is configured to update at least one safe area on the basis of the

location of the mine vehicle. Burns teach in the same field of endeavor the control system is configured to update at least one safe area (i.e. safety envelope) on the basis of the location of the mine vehicle (col 5, line 24 – col 6, line 67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such system as taught Burns in the system of Sarangapani modified by Makela et al and Ishida et al for better accuracy in determining the safe area of the vehicle; thus, efficiently protecting the vehicle from potential collision.

8. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

Conclusion

9. The cited prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuong Nguyen whose telephone number is 571-272-3445. The examiner can normally be reached on 8:00 - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CN

JACK KEITH
SUPERVISORY PATENT EXAMINER